External Awards

JSPS Nano-probe Technology Encouragement Award

Winner: Youichi Shinozaki, NTT Basic Research Laboratories
Date: Aug. 4, 2010
Organization: The 167th Committee on Nano-probe Technology, the Japan Society for the Promotion of Science (JSPS)

For "Observation of structural dynamics in single receptor proteins by fast-scanning atomic force microscopy (AFM)".

He observed the structural dynamics in single receptor proteins under liquid conditions.

The 27th Paper Award of JACG

Winner: Makoto Kasu, NTT Basic Research Laboratories
Date: Aug. 8, 2010
Organization: The Japanese Association for Crystal Growth (JACG)

For "Surface growth kinetics of metalorganic vapor phase epitaxy and its application to highly efficient aluminum nitride devices".

He observed growth nuclei and atomic steps of metalorganic vapor phase epitaxy (MOVPE), which is a widely used growth method in the industry, by scanning tunneling microscopy in combination with surface passivation in the MOVPE system and clarified the surface growth kinetics. With this knowledge, he successfully obtained high-quality nitride crystals and demonstrated highly efficient aluminum nitride devices.

Papers Published in Technical Journals and Conferences Proceedings

Ultimate Widegap Semiconductors: Diamond and Aluminum Nitride

M. Kasu

Proc. of Joint Seminar held by KPI (Kyiv Polytechnic Institute) and NTT, National Technical University of Ukraine, Kyiv, Ukraine, Vol. 1, No. 1, pp. 1–2, Nov. 2009.

With the recent progress of widegap semiconductor technologies, high-quality diamond and nitride semiconductors have been developed. NTT has focused on diamond and aluminum nitride (AlN) from electronic and optical device viewpoints, respectively.

A Flexible Super-high-resolution Video Codec and Its Trial Experiments

T. Yoshitome, K. Nakamura, and K. Kamikura

Signal and Communication Technology, Springer, pp. 177–195, 2010.

We propose a flexible video codec system for super-high-resolution videos such as those utilizing 4K × 2K pixels. It uses the spatially parallel encoding approach and has sufficient scalability for the target video resolution to be encoded. A video shift and padding function has been introduced to prevent the image quality from being degraded when different active line systems are connected. The switchable cascade multiplexing function of our system enables various super-high resolutions to be encoded and super-high-resolution video streams to be recorded and played back using a conventional personal computer. A two-stage encoding method using the complexity of each divided image has been introduced to equalize the encoding quality among multiple divided videos. System time clock sharing has also been implemented in this codec system to absorb the disparity in stream reception times among channels. These functions enable highly efficient, high-quality encoding for super-high-resolution video. The system was used for 6K × 1K video transmission of a soccer tournament and 4K × 2K video recoding of a concert by the Saito Kinen orchestra.

Room-temperature Nitride Layer Growth on ZnO Substrate by PLD Method

M. Kasu

Journal of the Surface Science Society of Japan, Vol. 31, No. 5, p. 265, 2010 (in Japanese).

In nitride semiconductors, lattice-matched substrate technology is still a problem. I review recent technology for room-temperature GaN growth on ZnO by pulse laser deposition.

Throughput Analysis of Two-hop Wireless CSMA Network Coding

D. Umehara, S. Denno, M. Morikura, and T. Sugiyama

Proc. of 2010 IEEE International Conference on Communications (ICC), Vol. 1, No. 1, pp. 1–6, Cape Town, South Africa.

This paper considers two-hop wireless systems using network

coding and a carrier sense multiple access (CSMA) protocol. Network coding is a recent and highly regarded technology for the capacity enhancement of multiple unicast and multisource multicast networks. The two-hop wireless CSMA systems are often involved with the hidden node problem, but the impact of the hidden nodes on network coding has not been analyzed in theory. This paper provides explicit expressions of the throughput for single-relay two-hop wireless CSMA systems both without and with network coding. The throughput can be obtained from these expressions for given system parameters even when end nodes connected via a relay node are hidden from each other. Furthermore, it is shown that the transmit probability of the relay node is a design parameter that is crucial for maximizing the achievable throughput of CSMA systems with network coding. It is clarified that the throughput of CSMA systems can be enhanced compared with that for slotted ALOHA systems in the case of non-hidden end nodes, whereas it deteriorates considerably in the case of hidden end nodes.

Early lexical development in Japanese children: Age of acquisition of first 50 words specified using web diary method

T. Kobayashi and M. Nagata

Proc. of the 33rd Child Language Seminar (CLS2010), Vol. 33, No. 1, p. 61, London, UK.

Specifying the "age of acquisition" (AoA), which is the age at which a word is first learned, is an effective way to clarify early lexical development. Previous studies have estimated the AoA by using the age at which at least 50% of children produce a word on the basis of cross-sectional data, such as MacArthur CDI, or by relying on adults' retrospective memories. However, a more reliable and direct method is to collect the ages at which a word is first learned from a large sample of longitudinal data and to calculate the mean AoA. To determine the AoA in this fashion, this study used a diary method to collect the ages at which a word was first learned from a large sample of anonymous web users.

Organizing Knowledge of Question Answering Community with Hierarchical Auto-tagging

K. Nishida and K. Fujimura

DBSJ Journal, The Database Society of Japan, Vol. 9, No. 1, pp. 47–52, June 2010 (in Japanese).

Question answering communities have evolved rapidly as a new method of information retrieval. Representative communities organize Q&A documents with category hierarchies; however, the categories can never fully correspond to users' various knowledge and interests. We propose a system that assigns hierarchical tags—category, theme, and keyword tags—to documents by using both document classification and keyword extraction approaches. Experiments with the Q&A documents of Oshiete! goo show that our system is able to assign hierarchical tags corresponding to the documents.
